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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HORST PILLHOEFER, ERWIN BAYER, THOMAS DAUTL,
and STEFAN MUELLER

Appeal 2016-003205
Application 13/962,360¹
Technology Center 1700

Before BRADLEY R. GARRIS, ROMULO H. DELMENDO, and
SHELDON M. McGEE, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Applicants (hereinafter the “Appellants”) appeal under 35 U.S.C. § 134(a) from the Primary Examiner’s final decision to reject claims 21–40.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ The Appellants state that the real party in interest is “MTU Aero Engines AG” (Appeal Brief filed on August 24, 2015, hereinafter “Appeal Br.,” 3).

² Appeal Br. 3–22; Reply Brief filed on January 28, 2016, hereinafter “Reply Br.,” 2–5; Final Office Action (notice emailed on April 13, 2015), hereinafter “Final Act.,” 2–14; Examiner’s Answer (notice emailed on December 2, 2015), hereinafter “Ans.,” 2–14.

BACKGROUND

The subject matter on appeal relates to a process for producing a protective layer on a component (e.g., a component for a gas turbine or an aircraft engine) to provide protection against high temperatures and aggressive media (Specification, hereinafter “Spec.,” 1, ll. 11–16).

Representative claim 21 is reproduced from page 23 of the Appeal Brief (Claims Appendix) (emphasis added), as follows:

21. A process for producing a protective layer for protecting a component against high temperatures and aggressive media, wherein the process comprises forming a surface layer comprising aluminum and chromium on a surface of the component to be provided with the protective layer by (i) chromizing and (ii) alitizing, *the chromizing and/or alitizing of the component surface to be protected being carried out concurrently but differently in different regions of the surface to afford a protective layer having at least two regions which differ with respect to a concentration of chromium and/or a concentration of aluminum.*

REJECTIONS ON APPEAL

The Examiner rejected the claims under pre-AIA 35 U.S.C. § 103(a) as follows:

- I. Claims 21–30, 32, and 34–40 as unpatentable over Monson³ in view of Beers et al.⁴ (hereinafter “Beers”);
- II. Claim 31 as unpatentable over Monson in view of Beers,

³ US 3,290,126, issued on December 6, 1966.

⁴ US 5,225,246, issued on July 6, 1993.

Bianco et al.⁵ (hereinafter “Bianco”), and Basta et al.⁶
(hereinafter “Basta”);

III. Claim 33 over Monson in view of Beers and Shankar et
al.⁷ (hereinafter “Shankar”).
(Final Act. 2–14; Ans. 2–14.)

DISCUSSION

Rejection I

The Appellants provide general arguments under a sub-heading captioned “Traverse” and some additional arguments under various sub-headings identified by certain claim(s) (Appeal Br. 6–20). Notwithstanding the Appellants’ use of various sub-headings, we address claims individually below only to the extent that they have been argued separately within the meaning of 37 C.F.R. § 41.37(c)(1)(iv). Claims that are not argued separately within the meaning of the rule stand or fall with claim 21, which we select as representative. In this regard, skeletal arguments or arguments merely amounting to assertions that the references do not disclose or suggest certain claim limitations are not arguments for separate patentability within the meaning of the rule. *See In re Lovin*, 652 F.3d 1349, 1356–57 (Fed. Cir. 2011).

Claim 21:

The Examiner finds Monson teaches a method for producing a protective layer on a component (i.e., an article) by chromizing and alitizing

⁵ Robert Bianco et al., “Pack Cementation Diffusion Coatings,” *Metallurgical and Ceramic Protective Coatings* 236–60 (Kurt H. Stern ed. 1996).

⁶ US 5,658,614, issued on August 19, 1997.

⁷ US 4,526,814, issued on July 2, 1985.

but acknowledges that the reference “does not explicitly teach chromizing and / or alitizing in different regions of the surface concurrently but differently to result in the protective layer having different regions which differ with respect to a concentration of chromium or aluminum” (Final Act. 2–3). The Examiner finds further, however, that Beers describes a method for providing protective coatings on a blade (i.e., a turbine blade) in which the coating on the blade’s platform region is thinner than in other regions to avoid deleterious fracturing in the platform region while providing tailored high protection against oxidation and corrosion in other regions (*id.* at 3). The Examiner finds that Beers teaches such a difference in thicknesses to result in, e.g., a corresponding difference in aluminum concentrations in the blade region of about 23% and in the blade platform region of about 18% (*id.*). The Examiner concludes (*id.*):

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have applied chromizing and / or alitizing in different regions concurrently but differently resulting in the protective layer having different regions, as such an incorporation would predictably provide / allow for the tailored application of such protective coatings where [they] are most suitably required while limiting protection (and expenditure of materials) to portions where such high levels of protection would not be needed, or as in the scenario described by Beers such a thickness is deleterious with respect to fracturing, so article life would be improved.

Regarding Beers, the Appellants contend that Beers “is not concerned with different concentrations and/or layer thicknesses of any metal that is different from aluminum (such as, e.g., chromium) in two different regions of a protective surface layer on a turbine blade”—i.e., Beers “clearly fails to suggest that instead of a single metal (aluminum) a combination of two or more metals may be employed (let alone a combination of chromium and

aluminum)” (Appeal Br. 10–11). In addition, the Appellants argue that “the thickness of a coating and the concentration of a metal in a coating apparently are two different things” (*id.* at 13).

The Appellants’ arguments fail to identify a reversible error in the Examiner’s rejection. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011).

As a preliminary matter, we observe that the Appellants devote considerable portions of their Appeal Brief to arguments relating to the lack of a sufficient reason to combine Beers with Monson (e.g., Appeal Br. 8) (“It is not seen that one of ordinary skill in the art would assume that the problem addressed by BEERS also exists . . . in the case of the protectively coated nickel or cobalt articles of MONSON” and “MONSON does not even mention turbine blades . . .”). The Examiner’s obviousness analysis, however, relies primarily or exclusively on teachings found in Beers (Final Act. 3). Thus, notwithstanding the Appellants’ position that the Examiner stated that the rejection is based on the combined teachings of Monson and Beers (Appeal Br. 12; Ans. 4), the Appellants were on notice that the Examiner based the obviousness conclusion primarily or exclusively on Beers. *In re Kronig*, 539 F.2d 1300, 1302–03 (CCPA 1976) (no violation of procedural due process where the Board, without changing the thrust of the rejection, limited the discussion of the evidence to less than that discussed by the Examiner).

Turning to the merits, we find no merit in the Appellants’ argument that Beers does not teach both chromizing and alitizing. As the Examiner finds (Ans. 4–5), Beers teaches that “a shield is provided for use in coating articles with oxidation and/or corrosion resistant *metals such as aluminum, chromium, and the like*, by out-of-pack gas phase deposition” (col. 2, ll. 50–

53) (emphasis added). That teaching would not only have suggested the use of aluminum and chromium individually but also collectively. *In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980).

We are also unpersuaded by the Appellants' argument that Beers's coating thickness and coating concentration are unrelated. Consistent with the Examiner's finding (Ans. 8–9) (citing Beers col. 3, ll. 43–56 and col. 4, ll. 56–68), Beers teaches explicitly that “[a]s the coating thickness increases, the interdiffusion of the aluminum and the substrate decreases, thereby increasing the percent by weight of aluminum in the aluminide coating” (col. 1, ll. 45–49). A person having ordinary skill in the art would have reasonably expected that such a decrease in interdiffusion with increasing coating thickness would also occur when the coating material includes both aluminum and chromium, as suggested by Beers, thereby resulting in Cr and Al concentration differences between regions having different thicknesses.

For these reasons, we uphold the Examiner's rejection of claim 21.

Claim 24:

Claim 24, which depends from claim 21, recites that “the at least two regions differ with respect to the concentration of chromium and the concentration of aluminum” (Appeal Br. 23).

The Appellants argue that “it is not seen that BEERS also provides a motivation to additionally vary the coating thickness (let alone the concentration) of chromium” (*id.* at 15). As we discussed above, however, a person having ordinary skill in the art would have found it obvious to use both aluminum and chromium to form Beers's protective coating, as suggested by Beers, and when both metals are used, the regions having

different thicknesses would necessarily have different Al and Cr concentrations due to differences in interdiffusion.

Therefore, we uphold the rejection of claim 24.

Claim 25:

Claim 25, which depends from claim 21, recites that “the protective layer has three regions which differ with respect to the concentration of chromium and/or the concentration of aluminum” (Appeal Br. 23).

The Appellants argue that the Examiner has not “identified a third region of a turbine blade which according to BEERS is to be treated differently from the two regions of the turbine blade disclosed therein” (*id.* at 16). The Examiner, however, relies on Beers’s Figure 1 and column 4, lines 16–25, and explains that a region with the highest concentration would be the region that is not shielded, a region with an intermediate concentration would be the low pressure platform region, and a region with the lowest concentration would be the high pressure platform region (Final Act. 4–5). The Appellants fail to explain, with any reasonable degree of specificity, *why* the Examiner’s findings are erroneous. *Lovin*, 652 F.3d at 1356 n. 8 (approving the Board’s interpretation of “Rule 41.37 to require applicants to articulate more substantive arguments if they wish for individual claims to be treated separately”).

Therefore, we uphold the rejection of claim 25.

Claims 34–38:

Claim 34 recites (Appeal Br. 25):

34. The process of claim 21, wherein the at least two regions of the protective layer comprise at least two regions selected from (1) a region having a chromium concentration of from 40 % to 90 % by weight and an aluminum concentration of from 5 % to 35 % by weight, (2) a region having a chromium concentration

of from 5 % to 15 % by weight and an aluminum concentration of from 5 % to 35 % by weight, and (3) a region having a chromium concentration of from 15 % to 40 % by weight and an aluminum concentration of from 5 % to 35 % by weight.

Claims 35–38 are said to recite ranges narrower than those recited in claim 34 (*id.* at 18).

The Appellants contend that “[i]t is not seen that any of the recited concentration ranges, let alone any of the combinations of concentration ranges recited in claim 34, is rendered obvious by MONSON in view of BEERS” (*id.* at 17). The Appellants, however, fail to explain *why* the Examiner’s factual findings, analysis, and legal conclusion (Final Act. 7–8) include reversible error. Moreover, Al and Cr are included in Beers’s coatings to provide resistance to oxidation and corrosion (col. 2, ll. 53–55). Therefore, consistent with the Examiner’s position (Final Act. 8), a person having ordinary skill in the art would have understood that the amounts or concentrations for Al and Cr are result-effective variables, the optimum ranges of which would have been discoverable by routine experimentation. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1297 (Fed. Cir. 2012) (“A recognition in the prior art that a property is affected by the variable is sufficient to find the variable result-effective.”).

For these reasons, we uphold the Examiner’s rejection of claims 34–38.

Claim 39:

The Appellants merely state what claim 39 recites and then refer to the arguments offered for claims 24, 25, and 34–38 (Appeal Br. 19–20). Because we did not find the arguments offered from claims 24, 25, and 34–

38 persuasive, we also uphold the Examiner's rejection of claim 39 for the same reasons.

Rejection II

For claim 31, the Appellants argue that the Examiner's reasons "are based on mere speculation . . . and hindsight . . ." because Basta discloses repairing a previously aluminided blade by CVD, "which has virtually nothing in common with the processes of MONSON or BEERS, both of which do not at all relate to repair." (Appeal Br. 21). In addition, the Appellants rely on the same arguments offered for claim 21 (*id.*).

The Appellants' naked assertion that the rejection is based on mere speculation and hindsight because Basta relates to repair is ineffective to identify a reversible error in the Examiner's rejection, which provided specific factual findings and reasoning (Final Act 10–11). *Lovin*, 652 F.3d at 1356 n. 8.

Rejection III

For claim 33, the Appellants rely on the same arguments offered for claim 21 (Appeal Br. 22). Because we found the arguments for claim 21 unpersuasive, we also sustain the rejection of claim 33.

SUMMARY

Rejections I–III are affirmed. Therefore, the Examiner's final decision to reject claims 21–40 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED